

Nonproliferation and Safeguards: Then and Now`

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Safeguards: The Beginning

- An afterthought to Atoms for Peace
- Geneva Conference meeting
- Rabi proposes, Skobel'tsyn disposes
- Smith: Slow down plans for nuclear transfers? Strauss: No
- Libby: An effective safeguards system would cost too much
- Bottom line: Full speed ahead on nuclear energy, do safeguards later

The IAEA is Born

- Working with eight nuclear supplier states, the U.S. drafts an agency charter in 1954
- The draft is given to the USSR for review and then to all other UN members
- Following Geneva a new draft is produced by the 8 original states plus 4 others including the USSR and India.
- The new draft with amendments is presented and approved at a UN-proposed conference and is adopted by the UN as the IAEA Charter

Early Safeguards Issues

- Should source materials be safeguarded?
(UK, Belgium, Canada, Australia say “yes”; France, India say “no” and ultimately win)
- Should safeguards apply to all states?
(India says “yes” unequivocally, but the P-5 say that safeguards should attach to all states that receive assistance from the IAEA, which means no safeguards for the P-5)
- Should there be alternative bilateral or multilateral safeguards?
(The U.S. undermined the IAEA by promoting Euratom and bilateral safeguards)

Countering Proliferation: The NPT

- UNGA approves Irish resolution in 1961 calling on all states to refrain from transfer or acquisition of nuclear weapons
- After 6+ years of negotiation, NPT is born and opened for signature (July 1, 1968)
- 62 countries sign on first day, including the “depository governments” (U.S., UK, USSR)
- Currently 187 countries have signed and ratified
- Treaty was made permanent in 1995

NPT “Grand Bargain”

- Non-weapon states agree not to make or otherwise acquire nuclear weapons and to put all nuclear materials under safeguards (Articles II and III)
- Weapon states agree not to assist non-weapon states to make or otherwise acquire nuclear weapons and to require safeguards on all nuclear transfers to non-weapon states (Articles I and III)

NPT “Not So Grand Bargain”

- In return for pledging not to make nuclear weapons, non-weapon states have the right to participate in the fullest possible exchange of equipment, materials, and scientific and technological information for the peaceful use of nuclear energy”.
(Article IV)
- Germany, Japan insisted on this as a condition of their signing the Treaty

NPT and Disarmament

- “Parties to the Treaty (and especially the weapon states) agree to pursue negotiations in good faith on effective measures relating to the cessation of the nuclear arms race at an early date and to nuclear disarmament under strict and effective international control.” (Article VI)

How to Leave the NPT

- After giving 3 months notice and an explanation, each party “has the right to withdraw from the Treaty if it decides that extraordinary events, related to the subject matter of the Treaty, have jeopardized the supreme interests of the country.”

(Article X)

Weaknesses of the NPT

- It is not universal (187 countries have signed and ratified, but not India, Pakistan, and Israel; North Korea signed in 1991 but has withdrawn from the Treaty)
- Article IV allows a country to legally get close to having the bomb (Japan has 40 tons of Pu)
- Slow to non-existent progress on Article VI prompts ongoing complaints of discrimination from non-weapon states, loudest at 5-year NPT review conferences
- No automatic sanctions for violators

Safeguards Objective for NPT Parties (INFCIRC/ 153)

- “The timely detection of the diversion of significant quantities of nuclear materials from peaceful activities...and deterrence of such diversion by the risk of early detection”
- Definition of terms left to the Standing Advisory Group on Safeguards (SAGSI)

Detection Goals (SAGSI 1977)

- 90-95% probability of detecting a diversion of one significant quantity of (SNM), with a false alarm probability of less than 5%, with detection time less than or equal to conversion time
- 1 SQ of Pu = 8kg
- 1 SQ of HEU = 25kg of U-235
- Conversion time: 7-10 days for metal; 1-3 weeks for oxides or nitrates; 1-3 months for irradiated fuel

Limitations of Safeguards

- Safeguards are directed primarily to declared facilities
- Special inspections undertaken to resolve ambiguities must usually first gain cooperation of the inspected state
- States have the right to reject particular inspectors designated for their country by the IAEA
- NPT safeguards are not permanent

Limitations of Safeguards (Cont'd)

- SQ numbers are unrealistic
- Timeliness goal is unrealistic: Material balances are done on a yearly basis, while diversions can occur at any time; increasing the number of inventory takings is expensive and resisted by plant operators
- In a plant processing large amounts of material, the minimum detectable diversion will exceed 1 SQ by far
- Clandestine facilities obviate the need for diversion to make weapons

Responses to Safeguards Limitations

- Advanced technical approaches (e.g., Near Real Time Accountancy)
- Physical security
- Intelligence, surveillance, and the Additional Protocol
- Export controls (e.g. NNPA)
- Incentives to reduce safeguards burdens and assured sanctions for violators

Compensating for Limitations of NPT

- Nuclear Export Controls
 - Nuclear Suppliers Group (1974)
 - National Laws (NNPA of 1978)
 - Criminalizing export violations and nuclear assistance to subnational groups (UNSC 1540)
 - Proliferation Security Initiative
 - Intelligence sharing

Compensating for NPT Weakness (Cont'd)

- Positive or Active security assurances
(alliances, nuclear umbrella)
- Negative or Passive security assurances
(no nuclear attack on a non-weapon state
not allied with a weapon state)

Country-Specific Problems: North Korea

Main Issue: NK weapons could lead to sales and the risk of South Korea and Japan leaving NPT

- During Korean war both Truman and Eisenhower threaten the use of nuclear weapons against North Korea; war ends with armistice in 1953, but U.S. puts nuclear weapons in South Korea beginning in 1957
- NK Nuclear program begins with assistance from USSR (1960s) and China (1970s)
- Late 1970s: NK begins weapon program, starting with 5MW production reactor at Yongbyon
- 1984: Secretly begins construction of larger (50MW) production reactor (construction halted in 1994)

North Korea (Cont'd)

- 1985: NK signs NPT but takes 6+ years to sign safeguards agreement; builds reprocessing plant during this period
- 1991: NK and SK sign denuclearization agreement
- 1993: IAEA finds inventory discrepancy in NK spent fuel suggesting clandestine separation of up to 24kg Pu may have occurred and is prevented from inspecting two suspicious facilities; demands more inspection and investigation backed up by threats of sanctions
- 1993: NK announces intent to withdraw from NPT

North Korea (Cont'd)

- 1994: After U.S. threats of military action, NK suspends withdrawal from NPT; U.S. negotiates Agreed Framework with NK (NK to get two safeguarded reactors in return for freeze on program, ultimate removal of stored spent fuel and dismantlement of production reactors, ban on reprocessing, and ultimate resolution of IAEA safeguards issues)
- 2000: Implementation talks begin
- 2001: Implementation talks halted by Bush Administration, which calls NK part of “Axis of Evil”

North Korea (Cont'd)

- 2002: NK is discovered running secret enrichment program. Bush Administration negates Agreed Framework. NK terminates freeze, expels IAEA inspectors, resumes reprocessing stored spent fuel
- 2003: Six party talks begin, but have made no progress after five rounds
- 2006: NK announces they have built nuclear weapons. Test occurs on October 9
- UNSC votes for sanctions on October 14
- NK threatens second test on October 16
- NK announces willingness to enter sixth round of six party talks
- On Feb. 13, North Korea signed a six-party agreement to take initial actions to implement a Sept. 19, 2005 Joint Statement for the eventual abandonment of its nuclear weapons program.

North Korea

- "North Korea may have built an atomic suitcase bomb that could slip into this country. The good news, the airlines lost it." —Craig Kilborn

Iran

- Main issue: Clandestine Iranian program for uranium enrichment discovered in 2002, suggesting a weapons program in violation of Iran's NPT commitments
- Nuclear program began under the Shah via Atoms for Peace
- Shah wanted nuclear weapons, saw the civilian program as the best path

Iran (Cont'd)

- Khomeini stopped the nuclear program after the 1979 revolution, but started it again as a response to Saddam's use of chemical weapons during the Iran-Iraq war
- IAEA has not concluded that Iran has a weapon program, only that Iran is in technical violation of safeguards
- Iran has been asked to freeze (and ultimately abandon) its enrichment program by the U.S. and the EU-3 (France, UK, Germany), but has refused
- Iran has withdrawn its agreement to adopt the Additional Protocol to its safeguards agreement, and has not given the IAEA needed info to trace Iran's past enrichment activities

Iran (Cont'd)

- “Axis of Evil” designation and talk about “regime change” a la Iraq plus the example of North Korea combine to keep Iran on its present course barring unforeseen events
- If Iran leaves the NPT, others may follow (Saudis, Egypt, Syria)

Iran



Iran



India

- Main issue: India was first country to use a civilian program to make nuclear weapons and has unsafeguarded facilities, but wants nuclear trade
- India's refusal to accept full scope safeguards stopped nuclear trade with India, but Bush Administration seeks to change the law for India. Congress has agreed to do so under certain conditions. India is balking at the conditions.
- Nuclear trade with India would require a change to the rules of the NSG for India.
- China has said it will sign similar deal with Pakistan
- India is estimated to have 25-50 nuclear weapons

India



Pakistan

- Main issue: Pakistan, through the activities of its most well known scientist, A.Q. Khan, has spread bomb designs and weapon-related nuclear equipment to other countries, including North Korea, Iran, and Libya
- No sanctions have been imposed or even threatened (U.S. takes the position that Khan acted without authorization and that Pakistani agents caught attempting to smuggle weapon-related components out of the U.S. were acting independently of Pakistan's government)

Pakistan (Cont'd)

- Pakistan has 50-75 weapons based on HEU but is working on Pu
- Pakistan contains elements in the military and gov't that are sympathetic to Al Qaeda
- U.S./Pakistan relations have been up and down because of nuclear weapons but are currently up because of the war on terror and Musharraf's cooperation

Israel

- Main issue: In the absence of a political settlement in the Middle East, Arab states will maintain interest in nuclear weapons as long as Israel has them
- Israel's nuclear program began via Atoms for Peace, but weapon program was contributed by France in the wake of the Suez crisis (1956) with subsequent help from companies in South Africa and the U.S.
- Kennedy tried to stop Israel's program; every President since has given acquiescence
- Israel is estimated to have 200 nuclear weapons
- U.S./Israel relations have been unaffected by Israel's weapons nor by Israel's likely nuclear test in 1979

Nuclear Terrorism

- Subnational groups evincing interest in nuclear weapons (Aum Shinrikyo, Al Qaeda)
- Is there a black market in nuclear materials now that A.Q. Khan is “retired”?
- Can a subnational group make a nuclear weapon if they have the materials?
- Nunn-Lugar Program to improve security at former USSR installations

Motivation for NNPA: India's 1974 Test

- India is influential in establishing the legitimization, within the NPT, of PNEs and the right of state-parties to engage in uranium enrichment and reprocessing technology
- India begins intense design work on nuclear weapons in the late 1960s

U.S. Warning to the IAEA

- As a result of a number of statements by Gandhi that India was moving toward weapons capability, the U.S. sends an Aide Memoir in 1970 to the IAEA saying that a PNE based on Pu produced using U.S. heavy water would be a violation of the contracts under which we sold the material. India disagrees but says nothing formally.

India Tests

- On May 17, 1974 India sets off a nuclear test, calling it a “peaceful nuclear explosion” and not a weapon test
- The U.S., after a mild response to India, begins organizing the Nuclear Suppliers Group to craft a set of guidelines to restrain or prohibit sensitive nuclear exports

Does India Really Believe the Distinction?

- “The Pokhran test was a bomb, I can tell you now... An explosion is an explosion, a gun is a gun, whether you shoot at someone or shoot at the ground... I just want to make clear that the test was not all that peaceful”.

Raja Ramanna, Former Director of India's Nuclear Program, 10 October 1997
(speaking to the Press Trust of India)

Why the NNPA Was Needed

- It had become apparent that obtaining weapon materials and the means to make them should be recognized as proliferation, but U.S. law did not prohibit associated exports
- The AEC Regulatory Division (later the NRC) had no standards for export licensing except for an affirmation that an export would not compromise “the common defense and security”
- U.S. law did not prohibit exports to countries that rejected safeguards or diverted civilian facilities to military use
- Procedures for export licensing were unclear and interagency deliberations were ad hoc
- There were no explicit sanctions for violations of export criteria or nonproliferation standards

The NNPA of 1978 (Title III)

- Title III: Export Organization and Criteria (AEA Sections 123, 126-131)
- Section 123: Nine requirements for a nuclear Agreement for Cooperation including: Full scope safeguards; U.S. consent rights on reprocessing, enrichment, and retransfers; no R&D on nuclear explosives using U.S. exports; adequate physical security
- President can exempt one or more requirements if including them would be seriously prejudicial to US nonproliferation objectives or otherwise jeopardize the common defense and security
- Congress must review and approve (and must vote on an excepted agreement)

NNPA (Cont'd)

- Section 126: Lays out export licensing procedures and responsibilities of DOE, State, Commerce, ACDA, NRC. Executive Branch, via Secretary of State, must inform the NRC whether a proposed export will be inimical to the common defense and security before NRC issues a license
- Section 127: NRC must also check whether Section 123 requirements are being met before approving a license for a nuclear export to a foreign country. If Executive Branch says it's ok but NRC doesn't or can't issue the license, it goes to the President. President can issue the license; Congress can overturn.
- Section 128: Congress gets to review one license per year to a country whose Agreement for Cooperation with the U.S. does not include full scope safeguards.

NNPA (Cont'd)

- Section 129: Sanctions for violations (President can waive)
No nuclear exports to any non-nuclear weapon state (NNWS) found by the President to have, after 3/10/78:
 - detonated a nuclear device
 - terminated or abrogated safeguards
 - violated a safeguards agreement or an agreement for cooperation with the U.S.
 - engaged in ongoing bomb-related nuclear activities
 - assisted a NNWS to engage in bomb-related nuclear activities
 - entered into an agreement with a NNWS to transfer reprocessing technology except under an int'l agreement approved by the U.S.

NNPA (Cont'd)

- Title I: U.S. Initiatives to Provide Adequate Nuclear Fuel Supply
- Policy: U.S. will ensure it has the capacity to be a reliable supplier of nuclear fuel
- President is urged to seek negotiations with other nations and IAEA to establish an International Nuclear Fuel Authority (INFA) to provide fuel supply guarantees to countries with good nonproliferation credentials
- Fuel assurances shall be for NNWS if such states accept full scope safeguards, do not establish new enrichment or reprocessing facilities, and place any existing facilities under international auspices

Consequences of the NNPA

- Nuclear trade with India and other non-signers of the NPT came to an end
- Nuclear export licensing became regularized and more efficient due to statutory timetables
- Full scope safeguards became a standard adopted by the NSG in 1992 and endorsed by the UN at the 1995 NPT Review Conference
- It increased sensitivity on exports of fuel cycle technology

NP History-Is There a Case for Optimism?

- South Africa made nuclear weapons beginning in the 1970s, but agreed to dismantle them and sign the NPT after the Apartheid regime collapsed
- South Korea and Taiwan both had clandestine weapon programs but gave them up after discovery
- Sweden, Switzerland, Argentina, Brazil, others, had programs that they decided were not in their national security interest and abandoned them
- Libya tried to buy nuclear weapons in the 1970s and bought enrichment equipment from A. Q. Khan, but gave up their program after the purchases were discovered
- Kazakhstan, Ukraine, and Belarus gave up weapons in their possession when the USSR imploded and signed the NPT
- No evidence of theft of weapons or significant amounts of nuclear materials - yet

Future of the Regime: Is a Global Norm Sustainable?

El Baradei: 30 countries have the capability to make weapons quickly.

- U.S. leadership a requirement. Can U.S. maintain a discriminatory nonproliferation policy and be credible?
- Progress on Articles VI and IV a requirement. Can the Treaty survive if weapon states never agree to get rid of their weapons? Can enrichment and reprocessing technology be limited to some states but not others?
- Sanctions for violators a requirement. What about Pakistan? What about weapon states?
- Is nuclear power compatible with nonproliferation in the absence of a global norm and the presence of terrorists with interest in nuclear weapons?